

Weather Note

SNOWFALL AT SAN ANTONIO ON MARCH 16, 1959

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Snowfall at San Antonio in any month of the year is an unusual occurrence—an event for the local populace. A flake or two of snow falling in San Antonio causes the telephone lines to be jammed at the Weather Bureau, is headlined in the newspapers, and becomes the principal topic of conversation. The total number of days of measurable snowfall at San Antonio from 1885 to 1958, inclusive, is 27, with an average fall of about one-half inch a year. The average for March is a trace.

On the morning of March 16, 1959 hundreds of people called the San Antonio Weather Bureau office to report the falling of snow. A quick look at the meteorological conditions normally would have suggested discounting any reports of snow, as the current temperature was 50° F., and the freezing level was about 6,000 feet above the surface. Yet from 0755 to 0830 cst on March 16 flakes of snow were observed and recorded as a trace at the Weather Bureau and corroborated by a number of experienced observers. The ceiling at the time of the snowfall was 9,000 feet, the lowest reported at any time that day. San Antonio raobs indicated the freezing level at 8,000 ft. msl at 0548 cst and at 6,200 ft. msl at 1737 cst. A perusal of all available data indicated that the freezing level was at least 6,000 feet above the surface at the time of the snowfall and the surface temperature never fell below 50° F.

Conditions aloft were favorable for the occurrence of precipitation. At 700 mb. a trough passed over the station. At 500 mb. there was evidence of "digging" to the southwest of San Antonio with a major trough shearing over North Texas, and the forecast cut-off Low in West Texas was evident on the 1200 gmt 500-mb. chart for March 17. The temperature at 500 mb. dropped from -16° C. to -19° C. in the 24 hours ending at 0000 gmt, March 17. The 250-mb. chart for 1200 gmt, March 16 showed two SW-NE jet streams, one over North Texas and one over South Texas. The chart 12 hours later showed one jet stream through South Texas,

and later charts showed a continued southward shift of the jet stream. A normal sequence of events followed—a wave was induced and developed on the cold front in the Gulf of Mexico.

From thermodynamical considerations formation of snow aloft in this case was logical, but for it to reach the ground under the conditions on the morning of March 16 does not appear to be so reasonable. It is a common occurrence for aircraft to encounter snow in clouds above the freezing level, and for no snow to reach a surface with temperature well above freezing and far below the freezing level. When snow falling through the atmosphere melts, it absorbs from the air the same amount of heat as was released when it was being crystallized. Certainly, with very little snow falling through a thick layer of air with temperatures well above freezing, there should be no difficulty in the snow melting before it reaches the ground. In fact, it would seem impossible for snow under such conditions to reach the ground.

The most plausible explanation of the March 16 snowfall at San Antonio appears to be that the snow reached the ground in the cool air of vertical downdrafts from high-level thunderstorms or cumulonimbus clouds. There was some evidence of this from a slight increase in the surface winds and an increase in the surface pressure at the time of snowfall. Pilot reports indicated that a high-level instability line moved concurrently with the upper trough. Radar and pilot reports indicated tops of clouds to 31,000 feet. There were a number of pilot reports of snow, sleet, freezing rain, and hail at 4,000 to 8,000 feet msl east of San Antonio as the trough and high-level line of thunderheads or thunderstorms continued their eastward movement. Beeville reported sleet and rain at 0900 cst; Victoria reported sleet at 0915 cst; and Houston reported small hail at 1010 cst. Before the snowfall at San Antonio and before sunrise, snow was reported in West Texas and eastern New Mexico.